

APPENDIX B
SYSTEM SPECIFICATIONS

B.1 OVERVIEW

The R2E3 machine design is dedicated to Numerical Control. The following four sections list the systems mechanical and electrical specifications and features.

B.2 STANDARD FEATURES OF THE BRIDGEPORT R2E3 SERIES I MACHINE

1. Vertical heavy duty spindle with extra precision bearings in 3 3/8" diameter quill.
2. Uses #30 Quick Change Tooling.
3. A 2 HP continuous duty fan cooled AC induction motor with interlocked spindle brake.
4. Spindle speeds, 60-4200 RPM with interlocked power speed changer.
5. Head design based upon the proven 2J model.
6. Heavy head support with special rigid ram.
7. Large diameter turret support from standard column.
8. Dovetail ways throughout.
9. Chrome plated ways at table to saddle, and saddle to knee juncture.
10. Ballscrews 1 1/4" diameter in X and Y axes totally enclosed.

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11. Stationary X ballscrews to enable the drive mounting on the saddle.
12. Z ballscrews, 2 1/2" diameter, a ball quill design.
13. Ballscrews supported by steep angular contact thrust bearings.
14. Extended deep saddle to promote the accuracy and repeatability of table position.
15. Dual special locks on the side of the knee to bind the knee to the rigid column.
16. Table with larger mounting surface in XY directions, than XY travel, and surrounding coolant trough.
17. Axis drive motors mounted entirely clear of the operator's working area.
18. Closed loop DC servo drives with encoder feedback.
19. Travel limit switches with lamp indicator and override.
20. Chip and coolant shield surrounding the table working surface on 3 sides.
21. Splash back, chip, and coolant collector pan.

B.3 CONTROL FEATURES

1. 3 axis Simultaneous continuous path contouring.
2. 2 axis Circular Interpolation in switchable planes.
3. Minimum .0001 inch (0.001 mm) input resolution; .0001 inch (0.0025 mm) output resolution.
4. EIA RS-358 (ASCII) type format, EIA RS-274D compatible.
5. Absolute/incremental input in rectangular or polar coordinates.
6. Programmable absolute zero with software limit check.
7. Numeric keyboard, conversational format in Manual Data Input mode.

8. 40 character alpha numeric display, 24 status LED indicators.
9. Plus or minus decimal point programming with leading and trailing zero suppression.
10. Manual feedrate override 10%-125% infinity variable with enable control.
11. Constant vector velocity in any combination of axis motion.
12. Deceleration override.
13. Rapid Traverse X, Y, 250 IPM (6350 mm/min), Z axis, 200 IPM (5080 mm/min).
14. Canned Z axis cycles (8), including 2 deep hole drilling routines.
15. Transformation of data by programmable mirror image, rotation, or scaling.
16. Feed hold and continue without loss of position.
17. Canned mill routines (8) including Face, Circle, Cavity, Thread Mill.
18. Full jog control of any axis in any direction with variable traverse rate.
19. Jog handwheel.
20. Part Program storage capacity: 12,000 characters, 100 ft paper tape.
21. Edit via external data terminal with 22 command characters.
22. Block Edit via Front Panel controls.
23. Multiple part program storage, 6 digit identification.
24. Macro subroutines of up to 40 macros.
25. Repetitive programming including looping and conditional jumps.
26. Arithmetic expression evaluation, +, -, *, /, SQRT, SIN, COS, TAN, ATAN.

27. 24 maximum tool offsets and 24 diameter compensation values.
28. Tape input of all tool offset values.
29. Non volatile storage for tool offset and compensation data.
30. Bi-directional search for program number, sequence number, tool number.
31. Display of part program comments.
32. Automatic or Block-by-Block operation with Optional Stop, Block Delete.
33. Dry run modes: NO Z, Maximum Feedrate, NO XYZ, Break Point.
34. Automatic tool withdrawl to quill home.
35. COOLANT FLOOD/MIST control (automatic, manual).
36. SPEED INCREASE/DECREASE control (manual).
37. Serial Port A interface, RS-232C compatible/or 20ma active current loop. Serial Port B interface, RS-422 with built in DNC loading.
38. Single electrical power connection to fusible disconnect.
39. Diagnostic routine for system self check on power up and reset.

B.4 TOTAL SYSTEM FEATURES

1. Single electrical power connection to Fusible Disconnect.
2. Electrical construction complies with the intent of NFPA 70 and 79.
3. Control cabinet is mounted on the machine structure.
4. Interlock on feed if spindle is not operating.

5. Factory scheduled school for General Training in Operating/Programming (1 man - 1 week).
6. Factory scheduled school for Maintenance (1 week and special fee).
7. Factory trained Service Engineer's Startup and Operator Training (1 day).
8. Single Source Service Responsibility is Bridgeport.
9. One year warranty on materials and workmanship of Bridgeport's manufacture.

B.5 LEADING DATA (SERIES I R2E3)

<u>RANGE</u>	<u>INCH</u>	<u>METRIC</u>
Table travel (X axis)	17.5 in.	444mm
Saddle travel (Y axis)	11.1 in.	282mm
Quill travel (Z axis)	5 in.	127mm
Knee travel (manual)	14 1/2 in.	368mm
Throat distance	14 1/2 in.	368mm
Table to spindle up at gage line	7 1/8 in.	181mm
Maximum vertical load uniform distribution	300 lbs.	136kg

TABLE

Overall size	42 x 16 1/8 in.	1067 x 410mm
Working surface	34 x 12 1/2 in.	864 x 318mm
T-slots	3 on 4 3/8 in. centers	3 on 111mm centers
T-slot size	5/8 in.	15mm
Positioning speed	250 ipm	6350mm/min
Height above floor max.	47 1/2 in.	1207mm

SPINDLE

Motor rating	2 HP	1.5kW
Taper	#30 for quick change holders	
Speed range	60-4200 RPM	
Transmission ratios	1:1 and 8.92:1	
Rapid approach rate (Z axis)	200 ipm	5080mm/min
Controlled downfeed range	.1-100.0 ipm	2-2540mm/min

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(Z axis)

Drilling capacity mild steel	3/4 in. dia.	19mm dia.
Milling capacity mild steel	1.5 cu in/min	25 cc/min
Boring range	To 4 in. dia.	To 102mm dia.
Spindle diameter	1 3/8 in.	35mm
Quill diameter	3 3/8 in.	86mm

MILLING

Feedrate	.1-100.0 ipm	2-2540mm/min
Feed increments	0.1 ipm	1mm/min
Override infinitely variable	10-125% with feed hold	
Vector feedrate control (XYZ)	Constant to 100 ipm	2540mm/min

POSITIONING

Rapid traverse X Y	250 ipm	6350mm/min
Rapid traverse Z	200 ipm	5080mm/min

MACHINE AND CONTROL PERFORMANCE

Positioning accuracy	+/- .0008 in.	0.02mm
Positioning repeatability	+/- .0003 in.	0.01mm
Servo resolution	.0001 in.	0.0025mm
Input resolution	.0001 in.	0.001mm

CONTROL SYSTEM

System	Absolute/incremental CNC
Format	Interchangeable variable block
Format detail	:5N4G3X+34Y+34Z+34U+34V+34I+34J+34K+34R3 A+33P+34F31S4T2M2
Reference EIA Standards	RS-227, RS-274D, RS-358
Axis Drive	3KVA DC servo motors with encoder feedback

R2E3 FEATURES

Storage capacity	100 ft (30M) of equivalent EIA RS-358 tape
Subroutines	40 macros and 4 levels of nested loops
Editing	22 command characters
Part program loading	Paper tape or remote DNC LINK
Data Port A	Serial line interface @ 20ma or

Data Port B

RS-232

Serial line interface @ RS-232C or
RS-422 with RS-491 protocol

Maintenance

Diagnostics routines embedded in
systemSPACE AND WEIGHT

Floor area (doors open)	108 x 99	(2743mm x 2515mm)
Floor area (doors closed)	64 x 64	(1626mm x 1626mm)
Height	92"	(2337mm)
Weight (with control)	3150 lbs.	(1429 kg.)
Shipping weight	3550 lbs.	(1610 kg.)

POWER

Electrical supply 60Hz, 3 phase	230V/460V single connection or 208V on special order
Main power breaker	25A/15A per phase
Electrical rating	6 KVA
Pneumatic rating kg/c2)	4 cfm (.06cm/min) @75 psi (5.6 11 cfm (0.18cm/min) instantaneous

COLOR

Standard

Two tone gray for machine tools